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JUN 10 1970

CURRENT SERIAL RECORDS

# ***WATER SUPPLY OUTLOOK FOR WASHINGTON***

and

FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE.

and

DEPARTMENT of WATER RESOURCES STATE of WASHINGTON

Data included in this report were obtained by the agencies named above in cooperation with the U.S. Forest Service, U.S. Geological Survey, National Park Service, and other Federal, State and Private organizations.

AS OF  
JUNE 1, 1970

## TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1400 snow courses in Western United States and in the Columbia Basin in British Columbia. In the near future, it is anticipated that automatic snow water equivalent sensing devices along with radio telemetry will provide a continuous record of snow water equivalent at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

### PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	12417 Federal Building, Denver, Colorado 80202
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4012 Federal Building, Salt Lake City, Utah 84111
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 340, Casper, Wyoming 82601

### PUBLISHED BY OTHER AGENCIES.

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P O Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia





# **WATER SUPPLY OUTLOOK FOR WASHINGTON**

and  
FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

*Issued by*

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*Report prepared by*

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## WATER SUPPLY OUTLOOK

State of Washington  
June 1, 1970

\*\*\*\*\*  
\* The water supply outlook for irrigation and power for the state \*  
\* of Washington should improve from that which has been reported \*  
\* these past months. Runoff has been much below normal over most \*  
\* of the state during April and May due to low temperatures but \*  
\* also to the lack of rainfall. With the first of June a marked \*  
\* increase in valley temperatures occurred with many stations re- \*  
\* porting record highs for that date. These high temperatures \*  
\* will increase the evaporation rate and reduce runoff. Unless \*  
\* normal rainfall occurs some of the remaining snowpack will be \*  
\* lost to evaporation. Rainfall appears to be the factor now-- \*  
\* normal precipitation will result in adequate flows from the snow \*  
\* fed streams; sub-normal precipitation with its increased evapor- \*  
\* ation potential will result in water shortages especially later \*  
\* in the season. \*  
\*\*\*\*\*

### SNOW COVER

Only a few snow courses are measured on May 15 in the state and less on June 1. Of the few, in the state and tributary areas, the snowpack to the north and east is generally better than last year at this time but not as good as the average. Along the Cascades and in the Baker River drainage the snow is much poorer both compared to last year and average. There was an increase, percentage-wise, from the 15th to the 1st due to the lack of melting; also to the north and east and along the Cascades but in the Baker drainage the snowpack percentages remained about the same.

### RESERVOIR

None of the reservoirs have filled, except Coeur d'Alene Lake, but it is expected that there will be sufficient runoff during June to bring them up for adequate water this year. The carry-over to next year could be critical unless adequate rainfall occurs during June.

### STREAMFLOW

As stated above, runoff was below normal for the Spokane and Walla Walla Rivers. Rivers flowing from western Montana and British Columbia have been especially poor with the Okanogan and Similkameen having flows of 55 and 57 percent, respectively, and the Columbia at Birchbank having a flow of 74 percent of average. Along the central Cascades the Chelan, Wenatchee and Yakima have had river flows of 73 to 90 percent during May. On the west side only Skagit has had a flow less than 75 percent with the rest going as high as 99 percent.





RESERVOIR STORAGE - 1000 Acre Feet

BASIN or STREAM		USABLE <u>1/</u> CAPACITY	1970	1969	1968	Normal*
<u>COLUMBIA</u>						
Spokane	Coeur d'Alene Lake	225.1	344.9	289.5	218.0	327.0
Columbia	Franklin D. Roosevelt Lake	5232.0	2141.4	2122.3	2201.2	3965.2
Columbia	Banks Lake	761.8	712.2	347.4	364.4	435.3
Okanogan	Conconully Reservoir	13.0	5.9	12.9	7.9	9.8
Okanogan	Salmon Lake	10.5	9.3	10.5	10.3	9.6
Chelan	Lake Chelan	676.1	309.6	572.5	651.8	467.6
<u>YAKIMA</u>						
Yakima	Keechelus Lake	157.8	144.6	160.4	146.3	144.8
Kachess	Kachess Lake	239.0	219.4	240.5	224.2	228.9
Cle Elum	Lake Cle Elum	436.9	328.8	421.3	432.1	395.8
Bumping	Bumping Lake	33.7	29.7	29.6	23.2	30.6
Tieton	Rimrock Lake	198.0	157.1	197.5	168.4	180.4
<u>PUGET SOUND</u>						
Skagit	Ross Reservoir	1202.9	890.8	1105.0	1290.5	1000.5
Skagit	Diablo Reservoir	90.6	86.5	87.5	86.2	84.1
Skagit	Gorge Reservoir	9.8	8.3	8.4	8.0	--

1/ Based on Active Storage

\* 15-year average 1953-67



# SOIL MOISTURE - JUNE

Drainage Basin and Station	Number	Elev.	Profile Depth	(Inches) :	Soil Moisture Content		
				Total :	(Inches) as of June 1		
				Capacity :	1970	1969	1968
<u>CRAB CREEK</u>							
Jack Woods	18B3m	2600	48	13.6	8.5	8.9	9.3
Krause	18B4m	2440	48	13.6	8.7	9.1	7.8
Sheffels	18B5m	2360	48	13.6	8.6	7.9	6.7
Sherman	18B7m	2440	48	13.6	8.2	7.7	7.1
Wheatridge	18B6m	2200	48	13.6	8.4	7.6	7.1
<u>OKANOGAN</u>							
Salmon Meadows	19A2M	4500	48	5.4	3.7	3.6	3.8
Trout Creek	3-M	3600	48	7.3	Destroyed	5.4	4.7
<u>YAKIMA</u>							
Domery Flat	21B20m	2200	48	6.9	4.4	--	4.5
Lake Cle Elum	21B14M	2200	48	12.8	9.2	--	8.9
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	9.8	11.0	6.4
Helmers	17C2M	4400	48	12.0	9.7	11.4	10.9
<u>WENATCHEE</u>							
Upper Wheeler	20B7M	4400	48	12.7	9.2	9.8	9.3

# FALL SOIL MOISTURE

Drainage Basin and Station	Number	Elev.	Profile Depth	(Inches) :	Soil Moisture Content		
				Total :	(Inches) as of Oct. 1		
				Capacity :	1969	1968	1967
<u>CRAB CREEK</u>							
Jack Woods	18B3m	2600	48	13.6	7.5	7.1	5.2
Krause	18B4m	2440	48	13.6	5.9	5.2	4.9
Sheffels	18B5m	2360	48	13.6	4.5	4.9	3.7
Sherman	18B7m	2200	48	13.6	4.2	3.9	3.6
Wheatridge	18B6m	2200	48	13.6	5.4	4.6	4.0
<u>OKANOGAN</u>							
Salmon Meadows	19A2M	4500	48	5.4	2.7	2.7	1.5
Trout Creek	3-M	3600	48	7.3	3.8*	4.1	4.0
<u>YAKIMA</u>							
Domery Flat	21B20m	2200	48	6.9	Not available	3.1	4.8
Lake Cle Elum	21B14M	2200	48	12.8	Not available	5.2	9.1
<u>WALLA WALLA</u>							
Couse	17C3m	3650	48	11.1	6.1	7.4	5.4
Helmers	17C2M	4400	48	12.0	7.1	7.6	6.7
<u>WENATCHEE</u>							
Upper Wheeler	20B7M	4400	48	12.7	9.8	5.5	5.6

\* Nov 1 measurement



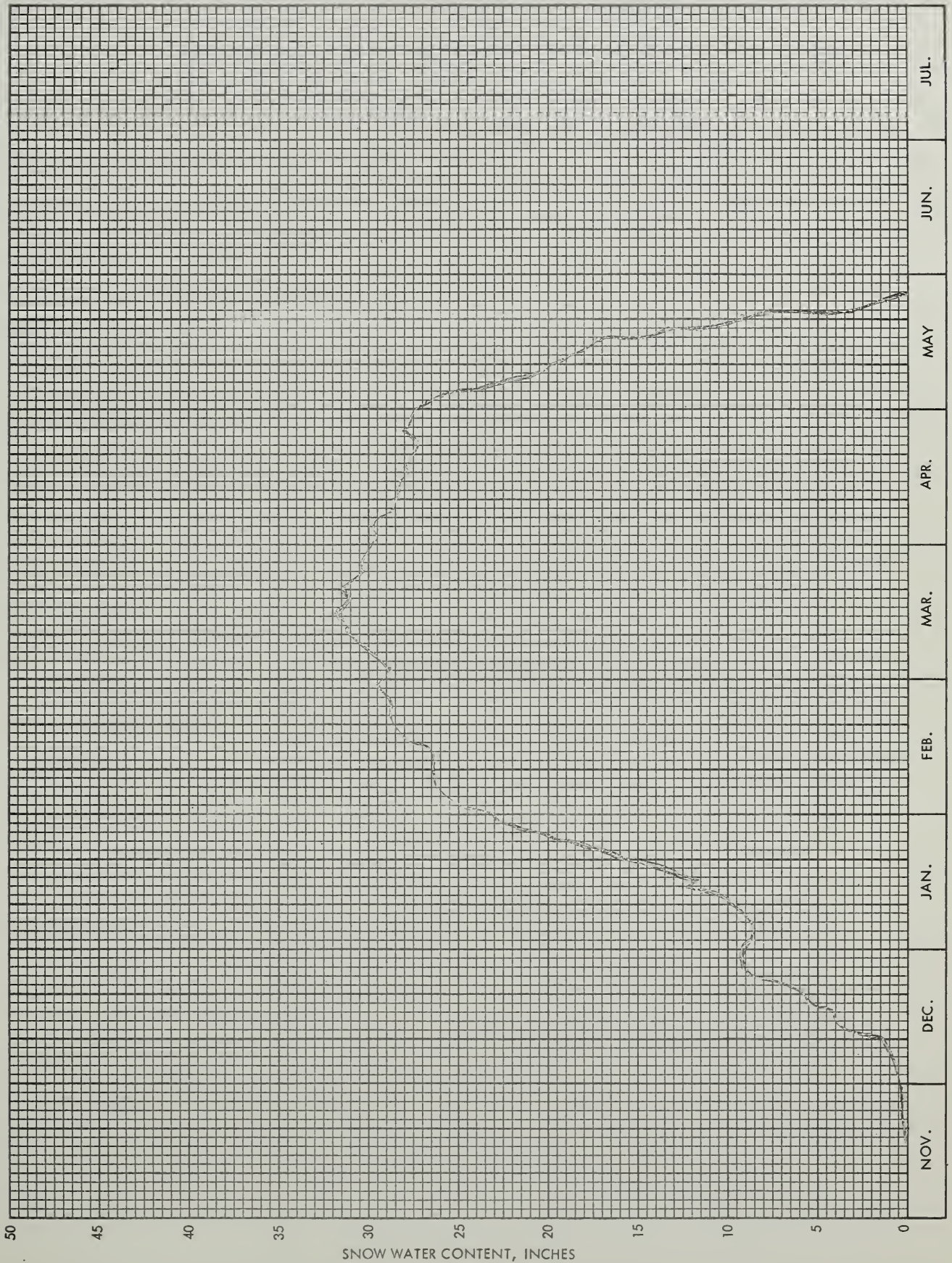


1969 - 70

# SNOW PILLOW DATA

Berne-Mill Creek

Sec. 13 T. 26N R. 14E No. 21B41SP Drainage: Wenatchee River  
 Lat. 47° 46' Long. 121° 01' Elev. 3170'

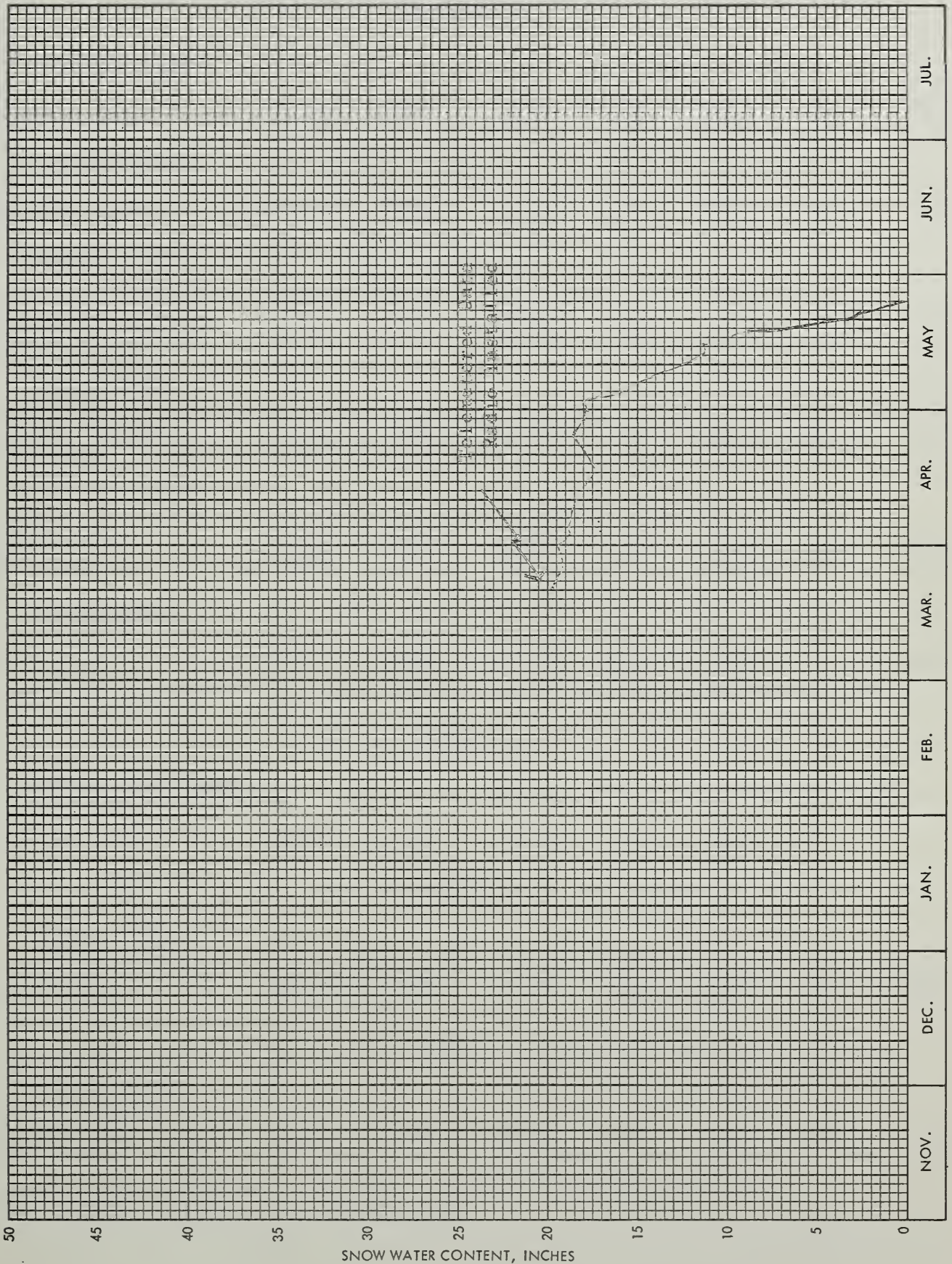






# SNOW PILLOW DATA

Sec. 10 T. 20N R. 20E No. 20B25SF Drainage: Colockum Creek  
 Lat. 47° 14' Long. 120° 19' Elev. 5310'





APPENDIX 1  
CORRECTIONS AND ADDITIONS - 1970 SNOW REPORTS

**SNOW**

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	NG.	Elevation				Last Year	Average <sup>++</sup>

February 1OKANOGAN RIVER

#Horseshoe Basin +	19A5a	7000	<u>2/3</u>	<u>39</u>	<u>10.5</u>	15.4	9.7*
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METHOW RIVER

Horseshoe Basin	19A5a	7000	<u>2/3</u>	<u>39</u>	<u>10.5</u>	15.4	9.7*
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YAKIMA RIVER

Bumping Lake (Old)	21C8	3450	<u>12/18</u>	21	4.2	4.1	4.2*
Bumping Lake (New)	21C36	3400	<u>12/18</u>	25	4.9	4.5	--

LEWIS RIVER

Lone Pine Shelter	21C26	3800	2/1	74	<u>22.4</u>	38.4	28.8*
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COWLITZ RIVER

Pigtail Peak	21C33	5900	<u>12/18</u>	40	10.4	--	--
Potato Hill	21C14	4500	<u>2/2</u>	80	<u>24.6</u>	36.6	20.8*

WHITE RIVER

#Cayuse Pass	21C6	5300	1/30	149	<u>49.8</u>	64.4	56.3*
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March 1CHELAN LAKE BASIN

Petersons +	20A16a	3730	2/18	78	<u>23.4</u>	--	--
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April 1METHOW RIVER

Dollar Watch +	20A29a	7000	2/26	<u>78</u>	26.5	28.1	23.7
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May 1SKAGIT RIVER

Lake Hozomeen	21A2	2600	4/28	13	<u>4.0</u>	5.9	5.8
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+ Snow water equivalent estimated from aerial stadia observation

# Not located directly on this drainage

\* Adjusted 1953-67 average

++ 1953-67 period







APPENDIX 2  
SNOW DATA MAY 1 to JUNE 1, 1970

SNOW			THIS YEAR			PAST RECORD	
DRAINAGE BASIN and/or SNOW COURSE			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	No.	Elevation				Last Year	Average ††

U P P E R C O L U M B I A D R A I N A G E

PEND OREILLE RIVER

Baree Creek	15B11	5500	5/14	103	44.6	35.2	43.4*
Baree Midway	15B16	4600	5/14	74	33.2	19.1	--
Baree Trail	15B15	3800	5/14	0	0.0	0.0	0.0*
Hoodoo Basin	15C10	6000	5/28	76	37.8	24.9	--
Hoodoo Creek	15C1	6200	5/28	74	36.5	24.6	32.0
Heart Lake	14C10	4800	5/28	7	3.0	0.0	--
Lookout	15B2	5250	5/14	86	37.9	26.6	--
			6/1	42	20.7	16.6	--
Nelson	Canada	3050	Not Measured			0.0	0.7**
Schweitzer Bowl	16A6	4500	5/28	0	0.0	0.0	--
Schweitzer Ridge	16A5	6100	5/28	60	29.5	43.0	--

KETTLE RIVER

Big White Mountain	Canada	5500	5/15	41	15.6	16.2	18.0**
			5/30	15	7.6	5.2	9.5**
Carmi	Canada	4100	5/15	0	0.0	0.0	--
Lower Trapping Cr.	Canada	3050	5/15	0	0.0	0.0	--
#Monashee Pass	Canada	4500	5/15	15	6.8	2.8	10.9**
			Not Measured			0.0	2.5**
Old Glory Mountain	Canada	7000	5/9	51	20.1	36.0	29.4**
			5/30	22	8.8	16.4	18.5**
Upper Trapping Cr.	Canada	5500	5/15	0	0.0	0.0	--

SPOKANE RIVER

Granite Peak	15B13A	6000	6/1	68	32.4	22.4	--
#Lookout	15B2	5250	5/14	86	37.9	26.6	--
			6/1	42	20.7	16.6	--
Lost Lake	15B14A	6000	6/1	79	41.0	43.0	--
Medicine Ridge	15B4A	6150	6/1	69	31.0	25.0	--

OKANOGAN RIVER

Blackwall Mountain	Canada	6250	Not Measured			31.2	36.0**
			5/27	45	22.4	18.3	28.4**
Enderby	Canada	6250	5/15	Not Measured		44.4	45.5**
			6/1	Not Measured		33.9	40.1**
Hamilton Hill	Canada	4900	Not Measured			3.4	6.8**
			5/28	0	0.0	0.0	0.9**
Isintok Lake	Canada	5510	5/15	12	4.2	1.9	-
Lost Horse Mountain	Canada	6300	5/13	30	8.8	5.6	9.9**
			Not Measured			0.8	3.4**

\* Adjusted 1953-67 average

# Not located directly on this drainage

\*\* Average for years of record

†† 1953-67 period



## APPENDIX 3

## SNOW

DRAINAGE BASIN and/or SNOW COURSE			THIS YEAR			PAST RECORD	
			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	No.	Elevation				Last Year	Average $\pm$

OKANOGAN RIVER (Cont.)

McCulloch	Canada	4200	5/14	0	0.0	0.0	0.7**
Missezula	Canada	5100	5/27	0	0.0	0.0	--
Mission Creek	Canada	6000	5/13	46	16.2	18.2	19.0
			5/25	25	10.5	5.4	11.5
Monashee Pass	Canada	4500	5/15	15	6.8	2.8	10.9**
			Not Measured			0.0	2.5**
Mount Kobau	Canada	5950	5/14	26	10.0	--	--
			5/29	2	0.8	0.0	--
Silver Star Mountain	Canada	6050	5/14	46	20.0	27.3	25.7**
			5/28	21	9.3	7.6	15.6**
Summerland Reservoir	Canada	4200	5/15	2	1.1	0.7	--
Trout Creek	Canada	4700	5/13	8	2.6	0.0	1.1**

ENTIAT RIVER

Entiat Meadows +	20A33a	4800	Not Measured			33.3	--
			5/28	54	27.0	--	--
Fox Camp +	20A36a	6510	Not Measured			52.0	--
			5/28	72	36.0	--	--
Pope Ridge	20B20	4300	5/14	0	0.0	--	--
Pugh Ridge +	20A32a	6400	Not Measured			31.7	--
			5/28	37	18.5	--	--
Shady Pass	20A37	5000	5/14	46	21.0	25.0	--
Snow Brushy +	20A35a	3850	Not Measured			19.2	--
			5/28	20	10.0	--	--
Tommy Creek +	20B21a	5300	Not Measured			9.4	--
			5/28	14	7.0	--	--

WENATCHEE RIVER

Stevens Pass	21B1	4070	5/15	102	51.2	45.4	46.6
			5/28	76	39.6	37.6	31.2*
Stevens Pass S. Shed	21B45	3700	5/15	51	25.2	22.2	--
			5/28	27	13.3	8.5	--

YAKIMA RIVER

#Stampede Pass	21B10	3000	5/15	83	43.8	38.3	--
			6/2	34	21.3	15.2	18.5*

PUGET SOUND DRAINAGEGREEN RIVER

Stampede Pass	21B10	3000	5/15	83	43.8	38.3	--
			6/2	34	21.3	15.2	18.5*

# Not located directly on this drainage

\* Adjusted 1953-67 average

++ 1953-67 period

\*\* Average for years of record

+ Snow water equivalent estimated from aerial stadia observation



## APPENDIX 4

SNOW			THIS YEAR			PAST RECORD	
DRAINAGE BASIN and/or SNOW COURSE			Date of Survey	Snow Depth (Inches)	Water Content (Inches)	Water Content (inches)	
NAME	No.	Elevation				Last Year	Average ++
<u>SKYKOMISH RIVER</u>							
#Stevens Pass	21B1	4070	5/15	102	51.2	45.4	46.6
			5/28	76	39.6	37.6	31.2*
#Stevens Pass S. Shed	21B45	3700	5/15	51	25.2	22.2	--
			5/28	27	13.3	8.5	--
<u>BAKER RIVER</u>							
Baker Pass +	21A27a	4900	5/15	168	79.0	--	--
			6/1	140	77.0	--	--
Dock Butte +	21A11A	3800	5/15	115	54.0	72.4	82.9
			6/1	70	38.5	51.8	66.1
Easy Pass +	21A7A	5200	5/15	144	67.7	78.0	108.0*
			6/1	101	55.5	63.2	--
Jasper Pass +	21A6A	5400	5/15	182	85.5	95.2	112.7*
			6/1	126	69.3	76.8	--
Marten Lake +	21A9A	3600	5/15	140	65.8	81.0	--
			6/1	94	51.7	60.6	--
Mount Blum +	21A18a	5800	5/15	152	71.4	--	--
			6/1	116	63.8	--	--
Rocky Creek +	21A12A	2100	5/15	0	0.0	20.6	--
			6/1	0	0.0	0.0	--
Schreibers Meadow +	21A10A	3400	5/15	94	44.2	66.0	--
			6/1	62	34.1	46.9	--
S. F. Thunder Creek	21A14A	2200	5/15	0	0.0	0.0	--
			6/1	0	0.0	--	--
Sulphur Creek	21A13	1600	Not Measured			1.1	--
Watson Lakes +	21A8A	4500	5/15	114	53.6	76.6	81.7*
			Not Measured			57.8	68.8*

# Not located directly on this drainage

++ 1953-67 period

\* Adjusted 1953-67 average

+ Snow water equivalent estimated from aerial stadia observation





# Agencies Assisting with Snow Surveys

## GOVERNMENT AGENCIES

### Canada:

Department of Lands, Forests and Water Resources,  
Water Resources Service, British Columbia

### States:

Washington State Department of Water Resources  
Washington State Department of Natural Resources

### Federal:

Department of the Army  
Corps of Engineers  
U. S. Department of Agriculture  
Forest Service  
U. S. Department of Commerce  
Weather Bureau  
U. S. Department of the Interior  
Bonneville Power Administration  
Bureau of Reclamation  
Geological Survey  
National Park Service

## PUBLIC AND PRIVATE UTILITIES

Chelan County P.U.D.  
Pacific Power and Light Company  
Puget Sound Power and Light Company  
Washington Water Power Company

## OTHER PUBLIC AGENCIES

Okanogan Irrigation District  
Wenatchee Heights Irrigation District

## MUNICIPALITIES

City of Walla Walla  
City of Tacoma  
City of Seattle

*Other organizations and individuals furnish valuable information for snow survey reports. Their cooperation is gratefully acknowledged.*

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UNITED STATES DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
ROOM 360, U. S. COURT HOUSE  
SPOKANE, WASHINGTON 99201

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domestic and municipal water  
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generation, navigation,  
mining and industry

*"The Conservation of Water begins  
with the Snow Survey"*